

PAVEMENTS

LIFE-CYCLE BENEFITS

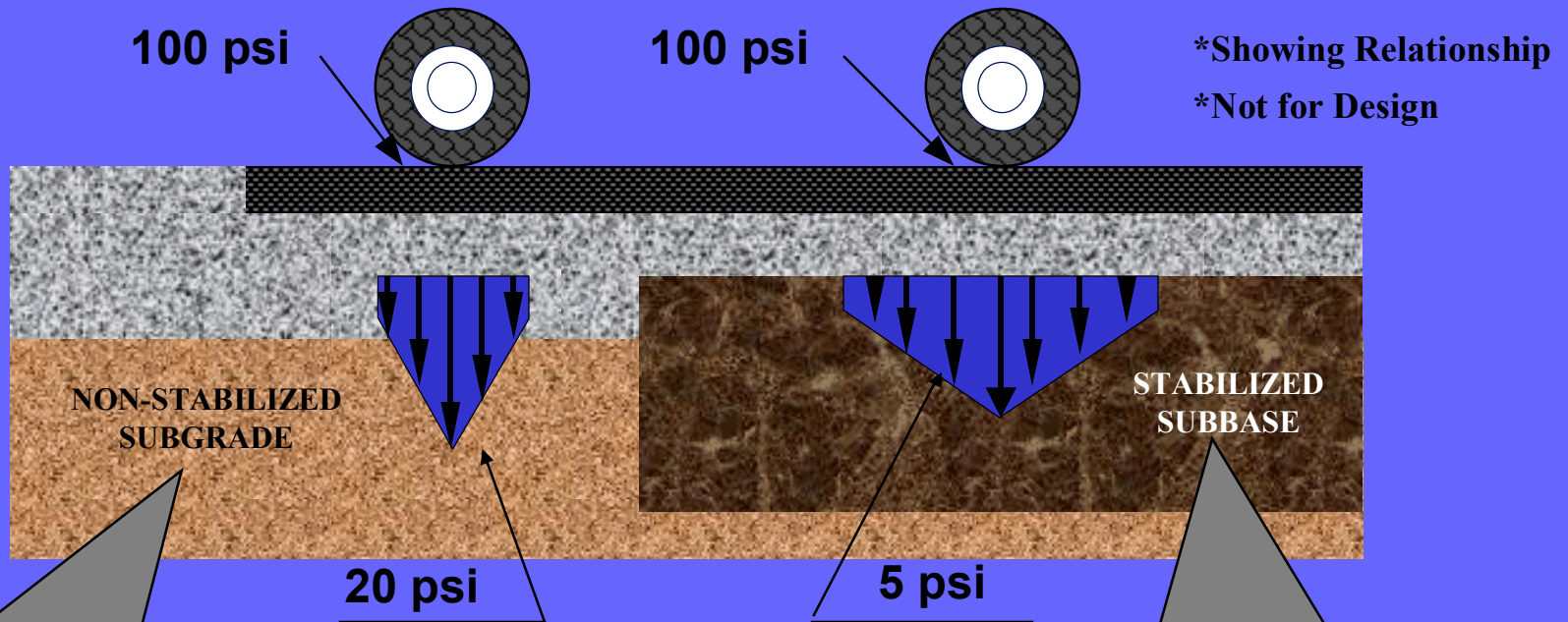
- INCREASES LOAD DISBURSEMENT OVER ENTIRE PAVEMENT SECTION
- REDUCES FATIGUE AND RUTTING OVER LIFE-CYCLE
- ASSIGN STANDARD STRUCTURAL VALUES
- INCREASED UNCONFINED STRENGTH OVER UNBOUND AGGREGATE
- MAINTAINS STRENGTH UNDER SATURATED CONDITIONS
- FOUNDATION SUPPORT FOR PERPETUAL PAVEMENT



PAVEMENTS

LOAD DISBURSEMENT

Disbursement of Loads Between a Non-Stabilized and Stabilized Pavement Section



Non-Stabilized Subgrade allows for more load influence on SG. When saturated, SG movement will reflect into pavement section.

Stabilized Subbase spreads load pressures over a greater surface area, allowing for bridging over underlying weak soils.

PAVEMENTS

REDUCED FATIGUE/RUTTING

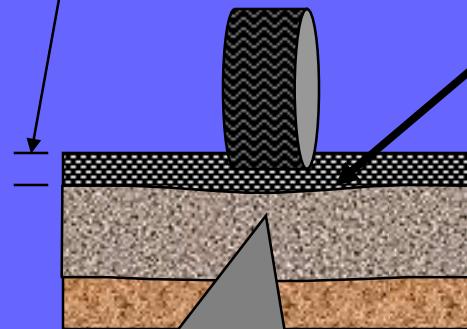
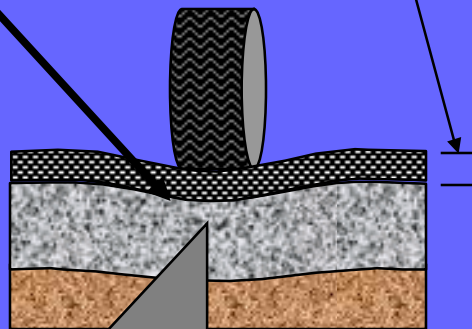
INCREASED LIFE-CYCLE BY REDUCED FATIGUE

Rutting can occur in surface, base and subgrade of unstabilized sections due to repeated wheel loading and moisture

Stabilized sections resist consolidation and movement, thus virtually eliminating rutting in all layers but the asphalt surface.

High deflection due to low base stiffness

Resulting in lower surface strains and longer pavement life



ASPHALT SURFACE

Unbound Base results in high surface strains and eventual fatigue cracking

Stabilized Base results in higher stiffness of stabilized base producing lower deflections

A standardized structural value is given to the stabilized section:

Caltrans Design Equation (Section 660):

$$G_f = 0.9 + (UCCS/1000) \quad UCCS \text{ in } psi$$

$$G_f = 0.9 + (UCCS/6.9) \quad UCCS \text{ in } MPa$$

Design Considerations:

Minimum Unconfined Strength = 300 psi

Maximum $G_f = 1.2$

Minimum Stabilized Section = 10 inches

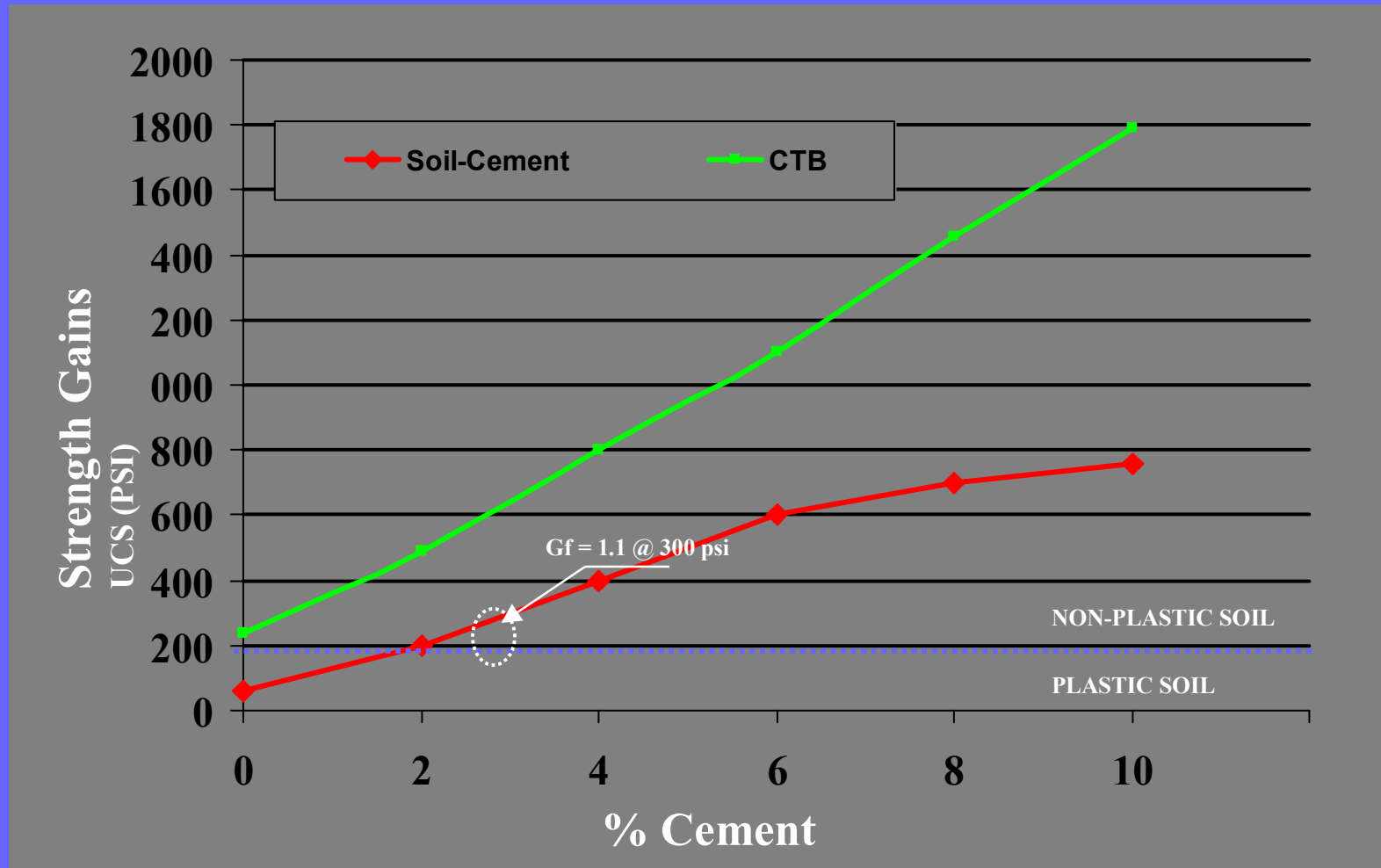


LIFE-CYCLE BENEFITS

UNCONFINED STRENGTH

Typical Strength Curves for Treated Bases and Soils

CEMENT

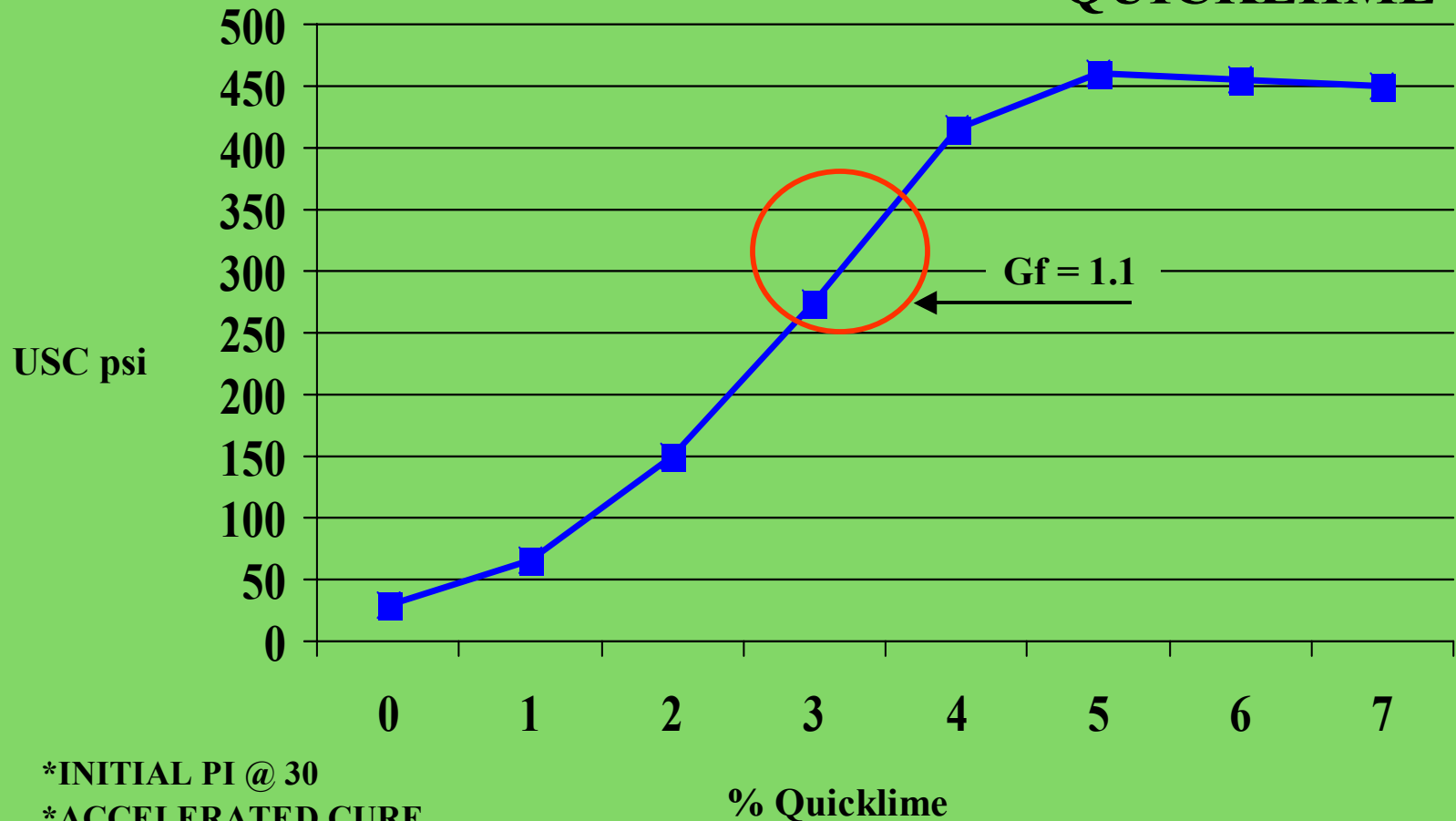


LIFE-CYCLE BENEFITS

UNCONFINED STRENGTH

Typical Strength Increase of Lime Stabilized Soil at 7 Days

QUICKLIIME



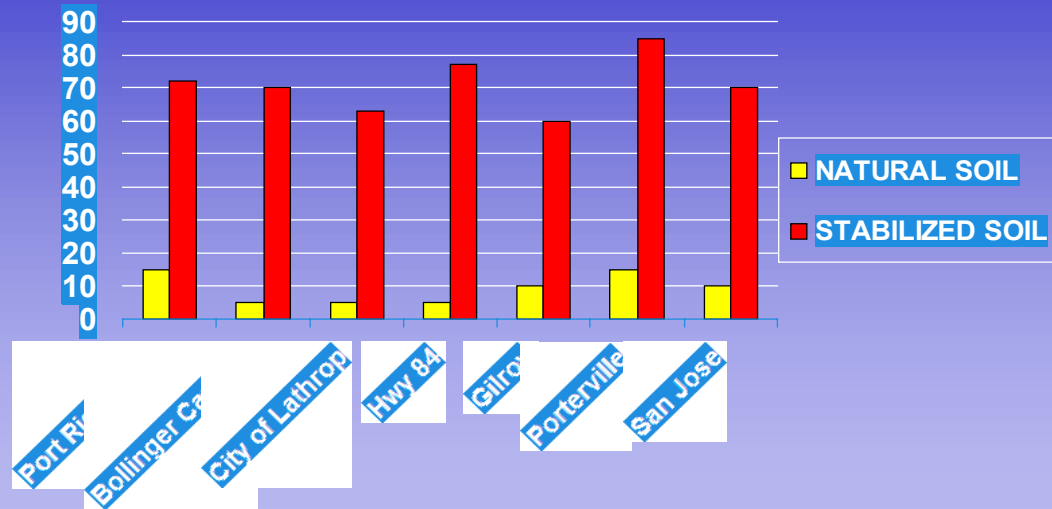
LIFE-CYCLE BENEFITS

INCREASED R-VALUE

Substantial increases in R-Value can be achieved by treating with 3 to 5 percent Quicklime.

Increasing R-Value will significantly reduce base section in pavement design

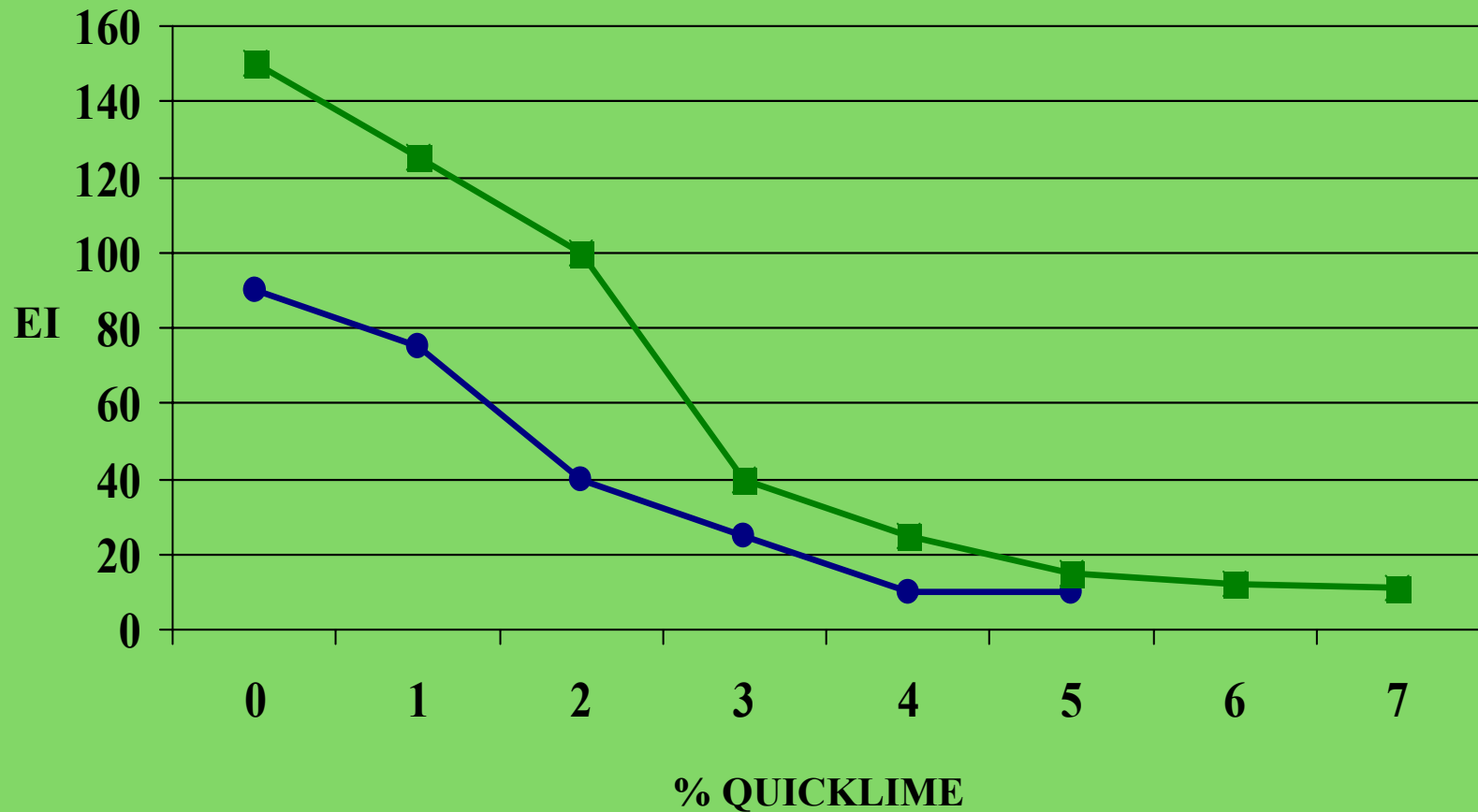
Recent California Projects R-Value Test Results



LIFE-CYCLE BENEFITS

EXPANSION REDUCTION

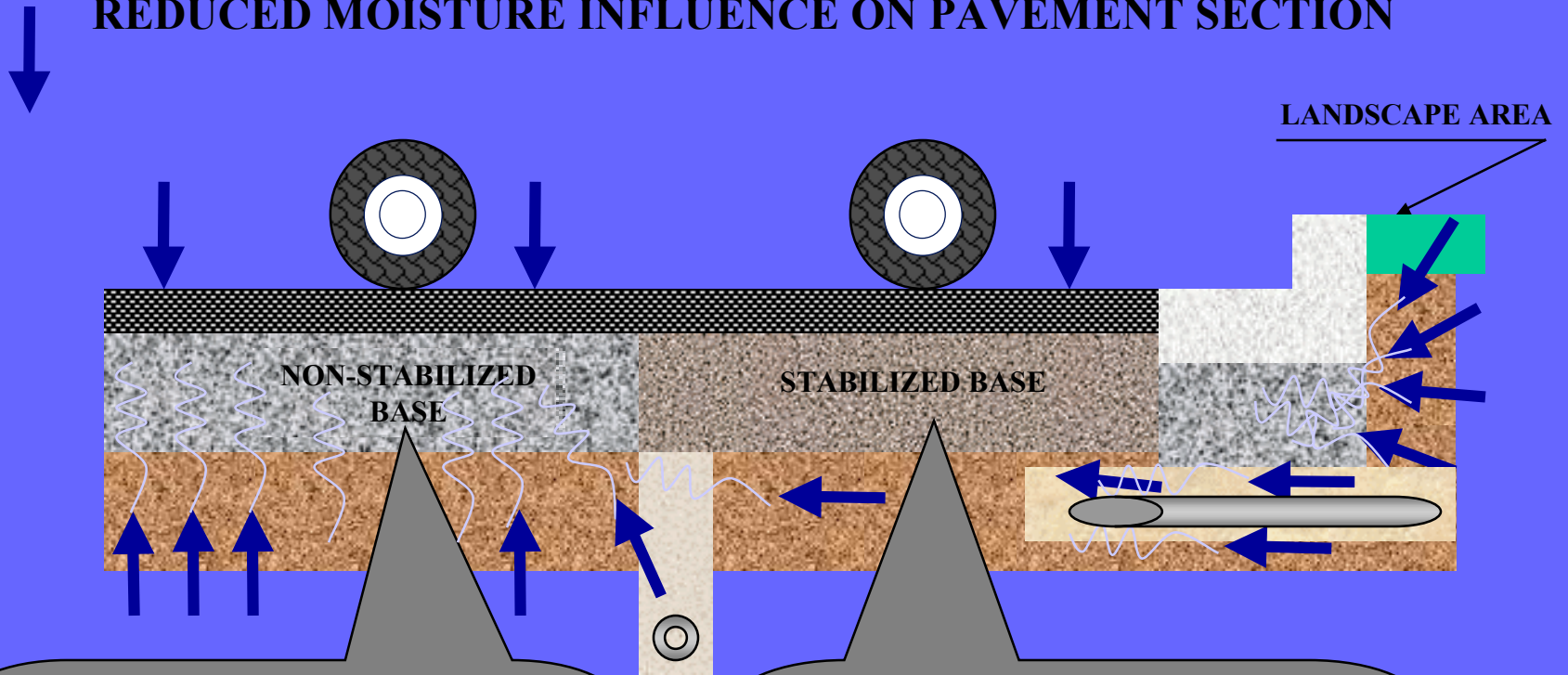
Typical Expansion Index Reduction with Lime Stabilization



LIFE-CYCLE BENEFITS

MOISTURE INFLUENCE

REDUCED MOISTURE INFLUENCE ON PAVEMENT SECTION



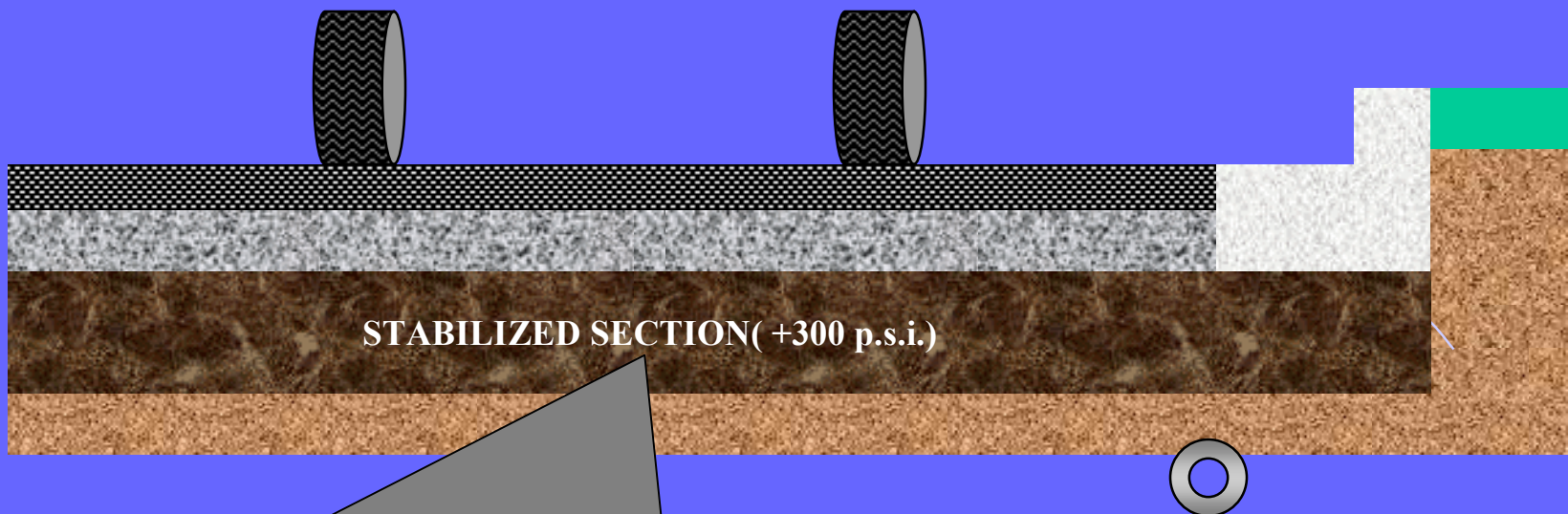
Moisture infiltrates base:

- Through surface water, trench leaching, or landscape irrigation
- Capillary action
- Causing softening, lower strength, and reduced modulus

Stabilization allows for:

- Reduced Permeability
- Significantly reduces moisture influences on Pavement
- Maintains strength and stiffness when saturated over time.

TREATED SECTION PERFORMS AS PAVEMENT FOUNDATION



- STABILIZED SECTION PROVIDES LOAD-BEARING SUPPORT BASED ON UNCONFINED STRENGTH
- STRENGTH IS MAINTAINED UNDER SATURATED CONDITIONS
- HIGHER STIFFNESS MODULE REDUCES FATIGUE OF UPPER PAVEMENT LAYERS
- PERPETUAL PAVEMENT SUPPORT CAN BE REALIZED